Meyer Sound

Operating Instructions

DS-2P

Self-Powered Mid-bass Speaker

Patents Pending

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Part #: 05.035.005.01 Rev B

Symbols Used

These symbols indicate important safety or operating features in this booklet and on the chassis.

Dangerous voltages: risk of electric shock	Important operating instructions	Frame or chassis	Protective earth ground
Pour indiquer les risques résultant de tensions dangereuses	Pour indequer important instructions	Masse, châssis	Terre de protection
Zu die gefahren von gefährliche spanning zeigen	Zu wichtige betriebs-anweisung und unter-haltsanweisung zeigen	Rahmen oder chassis	Die schutzerde
Para indicar azares provengo de peligroso voltajes	Para indicar importante funcionar y mantenimiento instrucciones	Armadura o chassis	Tierra proteccionista

Declaration of Conformity

According to ISO/IEC Guide and EN 45014

The Manufacturer:

Name: Meyer Sound Laboratories
Address: 2832 San Pablo Avenue
Berkeley, California 94702-2204, USA

declares that the product:

Product Name: DS-2P
Product Options: All

conforms to the following Product Specifications:

Safety:	EN 60065: 1994
EMC:	EN 55022: 1987 - Class A
	IEC 801-2: 1984 - 8 kV
	IEC 801-3: 1984 - 3 V/m
	IEC 801-4: 1984 - 0.5 kV Signal Lines, 1.0 kV Power Lines

The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC.

Office of Quality Manager
Berkeley, California USA
October 1, 1995

Environmental Specifications for Meyer Sound Electronics Products

Operating temperature:	0° C to +45° C
Nonoperating temp:	< –40° C or > +75° C
Humidity:	to 95% at 35°C
Operating altitude:	to 4600 m (15,000 ft)
Nonoperating altitude:	to 6300 m (25,000 ft)
Shock:	30 g 11 msec half-sine on each of 6 sides
Vibration:	10 – 55 Hz (0.010 m peak-to-peak excursion)

Made by Meyer Sound, Berkeley, CA, USA
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CE

UL LISTED 3K59 C UL
COMMERCIAL AUDIO SYSTEM

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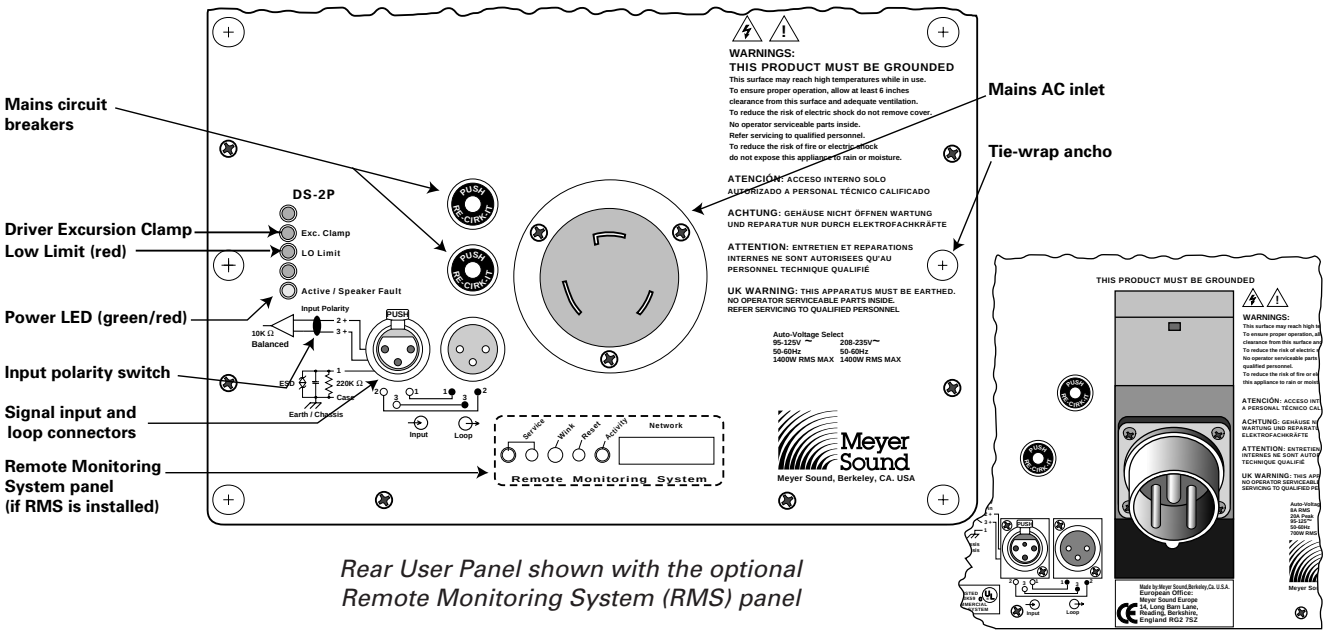
Controls and Connectors



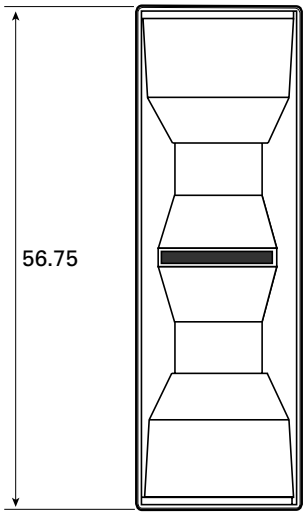
Rear User Panel shown with the optional Remote Monitoring System (RMS) panel

European User Panel with IEC 309 connector

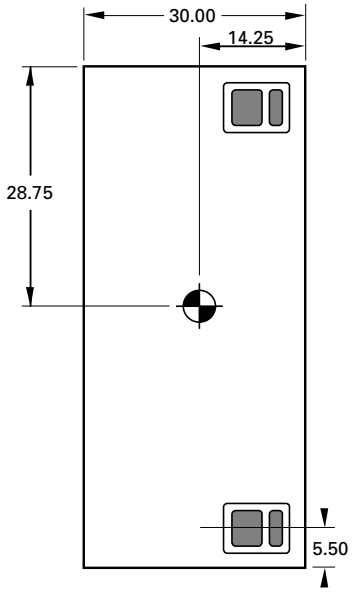
Dimensions

All units in inches

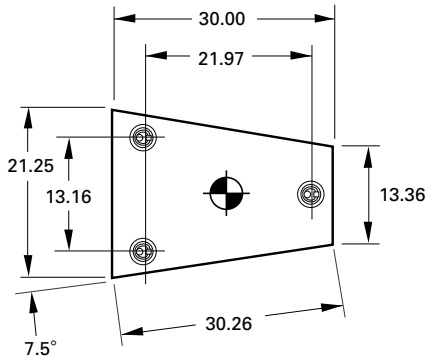
Front



Side



Top



Introduction

The Meyer **DS-2P self-powered mid-bass loudspeaker** is intended to supplement Meyer self-powered subwoofers but can also be used as a stand-alone subwoofer. When used with a Meyer subwoofer and crossover (such as the Meyer LD-1A Line Driver), frequencies below 80 Hz are sent to the subwoofer, and the mid-bass frequencies are sent to the DS-2P, allowing each speaker to function in its most efficient range. See page 8 for an overview of the LD-1A; contact Meyer Sound for additional information.

The DS-2P contains independent amplifier and control electronics for two 15" cone drivers in a compact folded horn enclosure. This integrated design improves performance, durability, and reliability, eliminates amplifier racks, and simplifies setup and installation.

The minimum configuration of two DS-2Ps have the following acoustical specifications:

Frequency Response	±4 dB 50 – 160 Hz
Phase Response	±60° 60 – 200 Hz ¿¿
Dynamic Range	> 120 dB
Coverage	120° H x 120° V

The DS-2P's trapezoidal shape facilitates the creation of speaker arrays that maximize the coverage area and SPL for the size of the array. Rigging hardware is provided to safely suspend the DS-2P in elevated installations.

The DS-2P can be equipped to operate with the **Remote Monitoring System** (RMS) interface network and software application. RMS displays signal and power levels, driver and cooling fan status, limiter activity, and amplifier temperature for all speakers in the network on a Windows-based PC.

AC Power

When AC power is applied to the DS-2P, the **Intelligent AC**™ supply automatically selects the correct operating voltage, allowing the DS-2P to be used in the US, Europe, or Japan without manually setting a voltage switch. The Intelligent AC power supply also performs surge suppression for high voltage transients (up to 275 V), minimizes inrush current, and filters EMI. *Continuous voltages above 275 VAC may damage the unit!* The DS-2P uses a NEMA L6-20P or IEC 309 male power inlet and satisfies UL, CSA, and EC safety standards.

Voltage Requirements

The DS-2P operates safely and without audio discontinuity if the AC voltage stays within the ranges 85–134 V or 165–264 V, at 50 or 60 Hz. Immediately after applying AC power, the green **Active** LED on the user panel illuminates and the proper operating voltage is automatically selected, but the system is muted. During the next three seconds, the primary fan turns on, the main power supply slowly ramps on, and the system is enabled to pass audio signals.

> *TROUBLESHOOTING NOTE: If the Active LED does not illuminate or the system does not respond to audio input after ten seconds, remove AC power to avoid possible damage to the unit. Experienced electronics technicians with access to a test bench can verify proper operation for the power supply and amplifier system with* The Meyer Sound Self-Powered Series MP-2 and MP-4 Field Verification Procedure *(part # 17.022.066.01; contact Meyer Sound to receive this document). All other users should contact Meyer Sound or an authorized Meyer service center.*

If the voltage decreases below the lower bound of either operating range (known as a *brown-out* period), the supply uses current from its storage circuits and continues to function briefly. The unit turns off if the voltage does not increase above the threshold before the storage circuits are depleted. The length of time that the DS-2P continues to operate during brown-out depends on how low the voltage drops and the audio source level during this period.

If the voltage fluctuates within either operating range, automatic tap selection stabilizes the internal operating voltage. This tap selection is instantaneous and there are no audible artifacts. If the voltage increases above the upper bound of either range, the power supply turns off rapidly, preventing damage to the unit.

If the DS-2P shuts down due to either low or high voltage, the power supply automatically turns on after three seconds if the voltage has returned to either normal operating range. If the DS-2P does not turn back on after ten seconds, remove AC power and refer to the *TROUBLESHOOTING NOTE* above.

Current Requirements

The DS-2P presents a dynamic load to the AC mains which causes the amount of current to fluctuate between quiet and loud operating levels. Since different types of cables and circuit breakers heat up (and trip) at varying rates, it is essential to understand the types of current ratings and how they correspond to circuit breaker and cable specifications.

The **maximum continuous RMS** current is the maximum RMS current over a duration of at least 10 seconds. It is used to calculate the temperature increase in cables, which is used to select cables that conform to electrical code standards. It is also used to select the rating for slow-reacting thermal breakers.

The **maximum burst RMS** current is the maximum RMS current over a one second duration. It is used to select the rating for most magnetic breakers.

The **maximum instantaneous peak current during burst** is used to select the rating for fast-reacting magnetic breakers and to calculate the peak voltage drop in long AC cables according to the formula

$$\mathbf{V}_{pk_{drop}} = \mathbf{I}_{pk} \times \mathbf{R}_{total\ cable}$$

Use the table below as a guide to select cables and circuit breakers with appropriate ratings for your operating voltage.

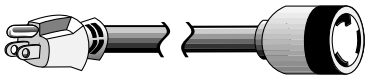
DS-2P Current Ratings			
	115 V	230 V	100 V
Max. Continuous RMS	8 A_{RMS}	4 A_{RMS}	10 A_{RMS}
Max. Burst RMS	15 A_{RMS}	8 A_{RMS}	18 A_{RMS}
Max. Peak During Burst	22 A_{PEAK}	11 A_{PEAK}	25 A_{PEAK}

The minimum electrical service amperage required by a system of Meyer speakers is the sum of their **maximum continuous RMS** currents. We recommend allowing an additional 30% above the minimum amperage to prevent peak voltage drops at the service entry.

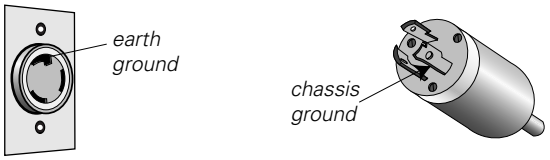
TROUBLESHOOTING NOTE: In the unlikely case that the circuit breakers trip (the white center buttons pop out), do not reset the breakers! Contact Meyer Sound for repair information.

Safety Issues

Pay close attention to these important electrical and safety issues.



Use a power cord adapter to drive the DS-2P from a standard 3-prong outlet (NEMA 5-15R; 125 V max).



The DS-2P requires a grounded outlet. Always use a grounding adapter when connecting to ungrounded outlets.

Do not use a ground-lifting adapter or cut the AC cable ground pin.

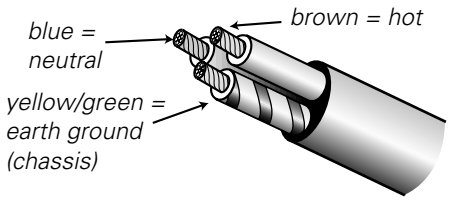
Keep all liquids away from the DS-2P to avoid hazards from electrical shock.

Do not operate the unit if the power cables are frayed or broken.

Tie-wrap anchors on the amplifier chassis provide strain relief for the power and signal cables. Insert the plastic tie-wraps through the anchors and wrap them around the cables.

Power Connector Wiring Conventions

Use the following AC cable wiring diagram to create international or special-purpose power connectors:



AC cable color code

If the colors referred to in the diagram don't correspond to the terminals in your plug, use the following guidelines:

- Connect the blue wire to the terminal marked with an *N* or colored black.
- Connect the brown wire to the terminal marked with an *L* or colored red.
- Connect the green and yellow wire to the terminal marked with an *E* (or ⏚) or colored green (or green and yellow).

Audio Input

The DS-2P presents a 10 kΩ balanced input impedance to a three-pin XLR connector wired with the following convention:

Pin 1 — 220 kΩ to chassis and earth ground (ESD clamped)
Pin 2 — Signal ┐
Pin 3 — Signal ┘ Differential Inputs
Case — Earth (AC) ground and chassis

Shorting an input connector pin to the case can form a ground loop and cause hum.

Pins 2 and 3 carry the input as a differential signal; their polarity can be reversed with the **input polarity** switch on the user panel. If the switch is in the up position, pin 2 is hot relative to pin 3, resulting in a positive pressure wave when a positive signal is applied to pin 2. Use standard audio cables with XLR connectors for balanced signal sources.

TROUBLESHOOTING NOTE: If abnormal noise (hum, hiss, popping) is produced from the loudspeaker, disconnect the audio source from the speaker. If the noise stops, then the problem is not within the loudspeaker; check the audio input and AC power.

A single source can drive multiple DS-2Ps with a paralleled input loop, creating an unbuffered hardwired loop connection. Make certain that the source equipment can drive the total load impedance presented by the paralleled input circuit. For example, since the input impedance of a single DS-2P is 10 kΩ, cascading 20 DS-2Ps produces a balanced input impedance of 500 Ω. If a 150 Ω source is used, the 500 Ω load results in a 2.28 dB loss.

Amplification and Protection Circuitry

Each driver in the DS-2P is powered by one channel of the Meyer MP-2, a 1240 W amplifier (620 W/ch) utilizing complementary power MOSFET output stages (class AB/H). The following sections discuss the MP-2's limiting circuitry and the two-fan cooling system.

TruPower™ Limiting System

Conventional limiters assume that the resistance of a speaker remains constant and set the limiting threshold by measuring voltage only. This method is inaccurate because the speaker's resistance changes in response to the frequency content of the source material and thermal variations in the speaker's voice coil and magnet. Conventional limiters begin limiting prematurely, which under-utilizes system headroom and deprives the speaker of its full dynamic range.

The TruPower limiting (TPL) system accounts for varying speaker impedance by measuring current, in addition to voltage, to compute the power dissipation and voice coil temperature. TPL improves performance before and during limiting by allowing the speaker to produce its maximum SPL across its entire frequency range. TPL also extends the lifetime of the drivers by controlling the temperature of the voice coil.

When the safe continuous power level is exceeded, a single limiter engages, affecting both amplifier channels equally. TPL activity is indicated by the **Sub Limit** LED on the user panel. The limiter ceases operation when the power level returns to normal and does not affect the signal when the LED is inactive.

The DS-2P performs within its acoustical specifications and operates at a normal temperature if the TPL LED is on for no longer than two seconds, and off for at least one second. If the LED remains on for longer than three seconds, the DS-2P is **hard limiting** with these negative consequences:

- Increasing the input level will not increase the volume.
- The system distorts due to clipping and nonlinear driver operation.
- The life-span of driver and amplifier components is reduced because they are subjected to excessive heat.

The TPL LED can indicate an imbalance in a system of speakers by functioning like a spectrum analyzer. If speakers in a subwoofer, mid-bass, or mid-hi subsystem begin to limit before reaching the required operating level for the entire system, then that subsystem needs to be supplemented with additional speakers.

NOTE: Although the TPL limiters exhibit smooth sonic characteristics, we do not recommend using them for intentional compression effects. Use an outboard compressor/limiter to compress a mixed signal.

Driver Excursion Clamp

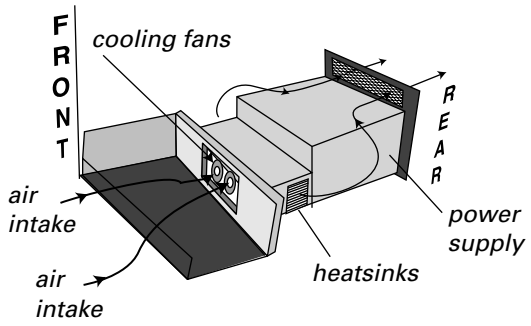
The drivers in the DS-2P are protected from over-excursion by an **excursion clamping circuit** that does not have attack or release time constants. The circuit provides instantaneous braking for the drivers without the *pumping* effects commonly produced by compressor / limiters.

The circuit uses sophisticated filters to minimize the distortion normally caused by clamping and clipping. As the DS-2P's input signal is increased past the clamping point, the output signal remains at a fixed level, protecting the drivers and minimizing negative sonic effects. The DS-2P operates safely if the **Exc. Clamp** LED is on for no longer than two seconds, and off for at least one second.

Fans and Cooling System

The DS-2P uses a forced-air cooling system with two fans to prevent the amplifiers from overheating. The fans draw air in through ducts on the front of the cabinet, over the heatsinks, and out the rear of the cabinet. Since dust does not accumulate in the amplifier circuitry, its life-span is increased significantly.

A foam insert filter, in combination with the entire front grill surface, acts as an air filter for the cooling system. Despite the filtering, extensive use or a dusty operating environment can allow dust to accumulate along the path of the airflow, preventing normal cooling. We recommend periodically removing the grill, filter, and amplifier module and using compressed air to clear dust from the grill, filter, fans, and heatsinks. Make sure that the air ducts are clear and that there is at least six inches clearance for exhaust behind the cabinet.



A variable-speed primary fan runs continuously with an inaudible operating noise of 22 dBA at 1 m at its slowest speed. The speed of the primary fan begins increasing when the temperature of the heatsinks reaches 42°C. The fan reaches full speed at 62°C and is barely audible near the cabinet, even without an audio signal.

In the unusual event that the heatsink temperature reaches 74°C, the secondary fan turns on; it turns off when the temperature decreases to 68°C. The secondary fan is audible at close proximity without an audio signal and turns on in response to

- primary fan failure (check its status immediately);
- accumulation of dust in the cooling system path;
- a prolonged period of high source levels in hot temperatures or direct sunlight;
- driver failure.

TROUBLESHOOTING NOTE: In the highly unlikely event that the secondary fan does not keep the temperature below 85°C, the DS-2P automatically shuts down until AC power is removed and reapplied. If the DS-2P shuts down again after cooling and reapplying AC power, contact Meyer Sound for repair information.

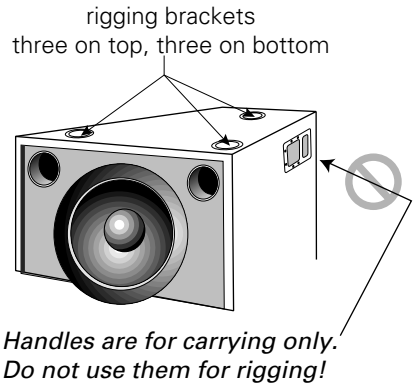
Rigging

The DS-2P weighs 221 lb (100 kg). The maximum recommended load for a single cabinet with aircraft pan fittings is 600 lb (273kg). This *working* load is based on a 5:1 safety factor. The DS-2P has six rigging brackets (three on top and bottom). Each bracket is capable of supporting the full working load of the cabinet.

There are four types of interchangeable rigging brackets, each fastened by six Phillips screws:

- aircraft pan fittings (ring and stud)
- 3/8"-16 nut plates
- M-10 x 1.5 metric nut plates
- blank plates (if no rigging brackets are requested)

NOTE: Units with nut plates are rated for the weight of one cabinet only.



Rigging load ratings assume a straight tensile pull and that the cabinet is in new condition with aircraft pan fittings. If these conditions are not met, the load ratings can be reduced significantly. Load ratings can also be reduced by age, wear, and damage. It is important to inspect the rigging hardware regularly and replace worn or damaged components immediately.

The cabinet, exposed electronic circuitry, and drivers can receive protective treatment that permits safe use in wet conditions. Additionally, a rain hood can be fitted to shield cables and electronics. *Do not install a unit outdoors without weather protection!* Contact Meyer Sound for more information.

NOTE: All Meyer Sound products must be used in accordance with local, state, federal, and industry regulations. It is the owner's and/or user's responsibility to evaluate the reliability of any rigging method for their application. Rigging should be done only by experienced professionals.

Measurement and System Integration Tools

It is essential that even the most carefully assembled sound systems be analyzed with precise measurement tools. We recommend using the Meyer **SIM® System II Sound Analyzer** and **CP-10 Parametric Equalizer** to

- assist the process of choosing and configuring speakers;
- measure propagation delays between subsystems to set the correct polarity and delay times;
- measure and equalize variations in frequency response caused by the acoustical environment and the placement and interaction of speakers.

Contact Meyer Sound for assistance with your application.

We recommend using the Meyer **LD-1A Line Driver** to integrate different types of Meyer self-powered speakers into a complete system. The LD-1A has two channels equipped to control a full-range main system, and six auxiliary channels for down-fill, front-fill, and delay systems. The LD-1A maintains signal integrity for long cable paths and provides the following useful functions:

- The **Lo Cut** switch activates a high-pass filter (160 Hz, –12 dB/oct, Q = 0.8) that performs a crossover function for the Mid-Hi output.
- The **DS-2 & Sub Crossover** switch (channels 1 and 2 only) activates a crossover network optimized for the DS-2P when used with the PSW-2 or 650-P. With the switch **in**, frequencies below 80 Hz are sent to the Sub output (for the 650-P), and above 80 Hz to the DS-2 output. When the subwoofer is used without the DS-2P, (or the DS-2P is used alone as a subwoofer) the switch should be **out**, which sends a full-range signal to both the DS-2 and Sub outputs.
- The **DS-2** ϕ and **Sub** ϕ switches (channels 1 and 2 only) toggle the polarity for the DS-2 and Sub outputs.
- The **Mid-Hi**, **DS-2**, and **Sub** outputs (channels 1 and 2 only) each have their own gain control and mute switch.

POLARITY NOTE: The polarity for Meyer self-powered speakers may be reversed using the input polarity switch on the user panel. The LD-1A also allows polarity reversal with the DS-2 ϕ *and* Sub ϕ *switches for speakers connected to the DS-2 and Sub outputs. When making polarity decisions in applications that include the LD-1A, check the state of all polarity switches.*

Complete Systems

The following Meyer speakers are mentioned in the example applications.

MSL-4, CQ	Self-powered mid-hi speaker
650-P	Self-powered subwoofer
DS-2	Externally amplified mid-bass speaker

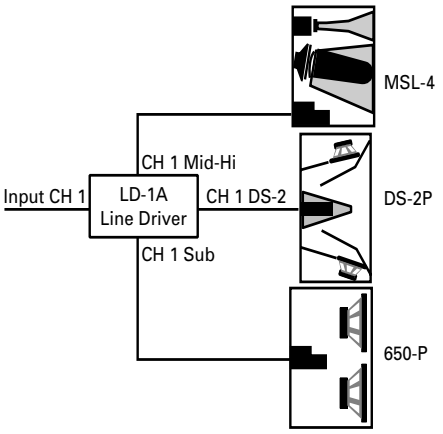
The Meyer self-powered speakers listed above have a **loop** connection to send the input signal to another speaker. Full-range signals may be applied to all Meyer self-powered subwoofers because they have built-in active crossovers that filter mid-hi frequencies.

LD-1A with MSL-4, DS-2P, and 650-P

Although the DS-2P can be used as a stand-alone subwoofer, it is most effectively employed with the 650-P to enhance low frequency (LF) power and clarity. The LD-1A is an effective tool to control this configuration containing three subsystems and two crossover points.

With the DS-2 & Sub Crossover switch **in,** the DS-2 and Sub outputs each receive signals optimized for the frequency response capabilities of the DS-2P and 650-P.

The MSL-4 is driven from the CH 1 Mid-Hi output with the Lo Cut filter **in** to minimize the overlap in frequency response with the DS-2P and 650-P. Set the 650-P to the opposite polarity to the MSL-4 and DS-2P.



Set the 650-P to the opposite polarity to the DS-2P and MSL-4.

LD-1A with MSL-4, DS-2P, CQ, and 650-P

This example shows the LD-1A integrating a complete system of self-powered speakers for a large venue. Although the diagram shows half of the system with channels 1, 3, and 5, channels 2, 4, and 6 can be used with identical connections for the other half. The MSL-4, DS-2P, and CQ arrays are flown; the 650-Ps are on the floor.

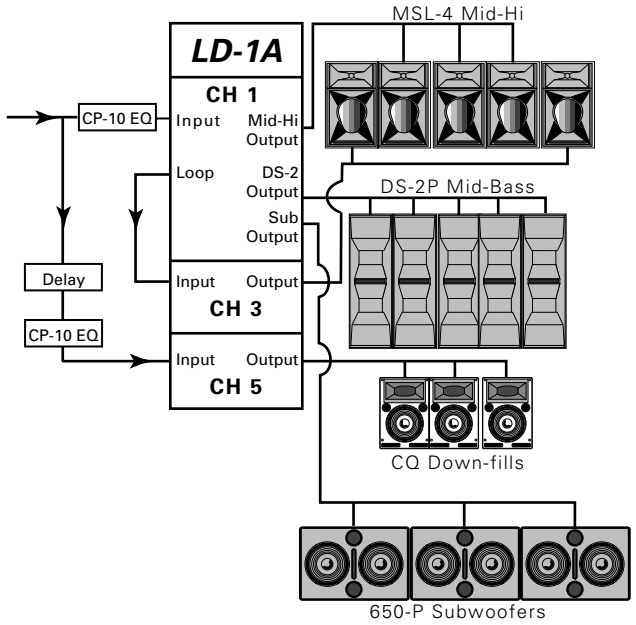
The CH 1 Mid-Hi and CH 3 outputs drive the inner three and outer two speakers of the MSL-4 array, applying appropriate levels for speakers directed at different distances. The diagram shows the additional mid-hi output created by connecting the CH 1 Loop to the CH 3 input. Using a Y-connection at the CH 1 input (as shown for the down-fills) accomplishes the same signal routing. The Lo Cut and Array EQ switches for both channels should be **in**. The Lo Cut filters eliminate the LF rise caused by the frequency response overlap between the MSL-4 and DS-2P / 650-P systems. The Array EQ filters minimize the MSL-4 array's low-mid rise.

The CH 1 DS-2 and Sub outputs drive the DS-2P and 650-P systems with the DS-2 & Sub Crossover switch **in**. Set the MSL-4 and DS-2P to the same polarity. The polarity of the 650-P depends on the height and distance of the measurement position from the subwoofer and flown systems.

CH 5 controls the CQ down-fill system. Since the main system is more powerful than the down-fill system to project farther into the venue, the main system is audible in the down-fill's coverage area. To insure that the speakers combine properly in the intersecting coverage area:

- Set the CQ to the opposite polarity to the MSL-4 to phase align the mid-hi frequencies and minimize the MSL-4's LF down-lobe.
- Use the CH 5 Lo Cut filter to eliminate the LF rise caused by the overlap in frequency response with the 650-P and DS-2P systems.
- Delay the down-fill to compensate for the propagation delay between the down-fill and main systems in the intersecting coverage area.

We recommend that the entire system be measured, phase-aligned, and equalized using the SIM System II Sound Analyzer and CP-10 Parametric Equalizer.

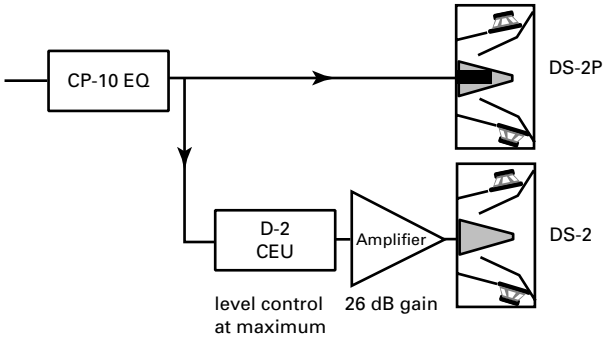


Set the CQ to the opposite polarity to the MSL-4 and DS-2P. The polarity of the 650-P depends on the height and distance of the measurement position from the the flown and subwoofer systems.

DS-2P and DS-2

Although it is preferable to employ the DS-2P in a completely self-powered system, the DS-2P can be used with the DS-2 externally amplified mid-bass speaker *if*:

- the D-2 CEU is set to the maximum output level;
- the DS-2 amplifier is set to 26 dB gain;
- the DS-2P is set to the same polarity as the DS-2 amplifier.



Set the DS-2P and the DS-2 amplifier to the same polarity.

Driver Troubleshooting

Troubleshooting with TPL

The TPL LED can indicate serious driver problems, if interpreted correctly. If one DS-2P in a system exhibits substantially more TPL activity than others receiving the same audio signal, then one or both drivers in that unit may have a short circuit. This is a potentially dangerous condition for the electronics; shut the DS-2P down immediately.

The TPL circuit does not activate if there is no power dissipation in the driver, regardless of the input signal level. Therefore, if all DS-2Ps in a system receiving the same audio signal exhibit TPL activity except one, then that unit may have an open voice coil; disconnect it and contact Meyer Sound for repair information.

> *NOTE: The Remote Monitoring System (RMS) provides precise information about peak power, peak voltage, and average voltage (VU) for each amplifier channel, enabling a more complete driver diagnostic than the TPL LEDs. Contact Meyer Sound for more information about RMS.*

Driver Replacement

To determine whether a driver is functioning properly, or replace a damaged driver, contact Meyer Sound to obtain the *Low Driver Inspection and Evaluation Procedure for Self-Powered Series Products* (part # 17.010.120.01).

Verifying Driver Polarity

Incorrect driver polarity impairs system performance and may damage the drivers. All Meyer loudspeakers are shipped with the drivers in correct alignment. However, if the driver or circuit wiring has been removed or disassembled in any loudspeaker in a system for any reason, it is essential to check the polarity between drivers in the same cabinet and between adjacent loudspeakers.

We do not recommend using phase poppers to analyze driver polarity. The phase response for all drivers varies, to some degree, over the frequency range in which it operates. Since the phase popper, a popular but inaccurate tool, does not discern variations in phase response with respect to frequency, it provides no useful information about the phase response through the crossover, the most important consideration for determining correct driver polarity.

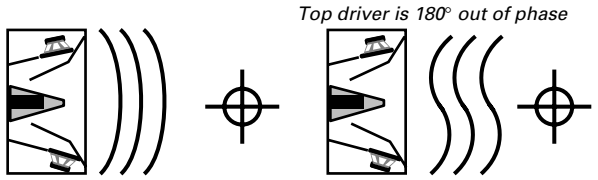
Phase poppers are, therefore, not useful for performing phase measurements on an individual loudspeaker or a full-range sound system containing one or more crossovers. If necessary, apply a phase popper only to loudspeakers with identical drivers without a crossover, and check the system's overall phase response with a frequency analyzer and / or listening test.

NOTE: Since polarity reversal causes excessive driver excursion at high source levels, use moderate levels for these tests.

Driver Polarity in the Same Loudspeaker

Use the following test procedure to verify polarity between drivers in the same loudspeaker:

1. Place a measurement microphone 3 ft from the front of the loudspeaker at the midway point between the two drivers.
2. Connect a signal source to the loudspeaker and note the frequency response.



Drivers with correct polarity cause acoustic addition

Drivers with reverse polarity cause acoustic cancellation

The polarity is correct if the frequency response is ±4 dB 50–160 Hz. Cancellation greater than 6 dB in the same range indicates polarity reversal.

Polarity Between Adjacent Loudspeakers

Use the following test procedure to verify the polarity between adjacent loudspeakers *of the same type*:

1. Position two loudspeakers adjacent to each other.
2. Place a measurement microphone 3 ft from the speakers on the axis between them.
3. Connect a signal source to one speaker and note the frequency response and overall level.
4. Apply the same signal to the second speaker with the first speaker still connected.

The polarity is correct if the frequency response remains constant with a significant increase in amplitude. Broadband cancellation (decreased overall level) indicates polarity reversal.

NOTE: Do not attempt to check more than two adjacent speakers in one test. Detecting polarity reversal among more than two speakers is difficult and may damage the drivers in the cabinet with reversed polarity.

Array Design

Array Design for Low Frequencies

Although the DS-2P is a called a *mid-bass* speaker, it still functions in the frequency realm of a subwoofer, especially when used as a stand-alone subwoofer without the 650-P or PSW-2. Subwoofer and mid-hi speaker array design differ because frequencies below 125 Hz are mostly omnidirectional; directionality increases with frequency. However, when several subwoofers are arrayed, the low frequencies can be focused. This section introduces some of the fundamental concepts for designing subwoofer arrays.

The coverage patterns of two DS-2Ps in a horizontal array interfere with each other such that the horizontal coverage narrows, without affecting the vertical coverage. A vertical array of two DS-2Ps narrows the vertical, without affecting the horizontal coverage. Due to the larger distance between drivers in vertical arrays, the vertical coverage narrows at a more significant rate than does the horizontal coverage for horizontal arrays, given the same array size.

Increasing the number of horizontal or vertical DS-2Ps in the array increases the corresponding *H* or *V* LF directional control. A properly designed vertical array steers low frequencies to include balconies and upper tiers, while a horizontal array focuses low frequencies for long throw distances without interacting with the walls.

One of the most important factors governing LF response is speaker placement relative to adjacent surfaces. The DS-2P gains significant LF power by coupling with nearby floors and walls. **Half-space** loading describes a speaker coupling with one surface. Speakers placed on the floor benefit from half-space loading, while flown speakers in free-space (without a nearby wall or ceiling) do not. In general, subwoofers in half-space generate twice the SPL (+6 dB) compared to the same number in free-space.

NOTE: The trapezoidal shape of the DS-2P does not represent the horizontal coverage area of the speaker.

DS-2P Coverage and Maximum SPL

A series of outdoor tests was conducted at Meyer Sound to determine the coverage angle and on-axis SPL for arrays with one row with up to six speakers. The measurements were conducted at a distance of 8 m with half-space loading; on-axis SPL values were interpolated from 8 m to 1 m. The coverage angle for the array is the result of averaging the –6 dB points from 60 to 160 Hz.

Since the DS-2P's horizontal coverage angle is wide (140°), splay angles larger than 15° are not often used. The 15° angle is optimal since it combines substantial SPL addition with a narrowing of the horizontal coverage. The 15° angle also corresponds to tight-packing DS-2Ps together along the edges of the enclosure, making array construction particularly convenient, especially for rigging clusters.

The following table shows the SPL and coverage areas for horizontal arrays with up to 6 DS-2Ps. The splay angle refers to the angle between cabinet centers.

If this information does not address your application requirements, contact Meyer Sound to obtain additional information on array design.

DS-2P Horizontal Array Coverage and Maximum SPL

1			2 @ 15°			3 @ 15°			4 @ 15°			5 @ 15°			6 @ 15°		
Coverage		Max Peak	Coverage		Max Peak	Coverage		Max Peak	Coverage		Max Peak	Coverage		Max Peak	Coverage		Max Peak
H	V	dB SPL	H	V	dB SPL	H	V	dB SPL	H	V	dB SPL	H	V	dB SPL	H	V	dB SPL
140	120	141	120	120	148	110	120	150	100°	120	149	90	120	153	80	120	154

Safety Summary

English

- To reduce the risk of electric shock, disconnect the loudspeaker from the AC mains before installing audio cable. Reconnect the power cord only after making all signal connections.
- Connect the loudspeaker to a two-pole, three wire grounding mains receptacle. The receptacle must be connected to a fuse or circuit breaker. Connection to any other type of receptacle poses a shock hazard and may violate local electrical codes.
- Do not install the loudspeaker in wet or humid locations without using weather protection equipment from Meyer Sound.
- Do not allow water or any foreign object to get inside the loudspeaker. Do not put objects containing liquid on, or near, the unit.
- To reduce the risk of overheating the loudspeaker, avoid exposing it to direct sunlight. Do not install the unit near heat emitting appliances, such as a room heater or stove.
- This loudspeaker contains potentially hazardous voltages. Do not attempt to disassemble the unit. The unit contains no user serviceable parts. Repairs should be performed only by factory trained service personnel.

Français

- Pour réduire le risque d'électrocution, débranchez la prise principale de l'haut-parleur, avant d'installer le câble d'interface allant à l'audio. Ne rebranchez le bloc d'alimentation qu'après avoir effectué toutes les connections.
- Branchez l'haut-parleur dans une prise de courant à 3 dérivations (deux pôles et la terre). Cette prise doit être munie d'une protection adéquate (fusible ou coupe-circuit). Le branchement dans tout autre genre de prise pourrait entraîner un risque d'électrocution et peut constituer une infraction à la réglementation locale concernant les installations électriques.
- Ne pas installer l'haut-parleur dans un endroit où il y a de l'eau ou une humidité excessive.
- Ne pas laisser de l'eau ou tout objet pénétrer dans l'haut-parleur. Ne pas placer de r´cipients contenant un liquide sur cet appareil, ni à proximité de celui-ci.
- Pour éviter une surchauffe de l'haut-parleur, conservez-la à l'abri du soleil. Ne pas installer à proximité d'appareils dégageant de la chaleur tels que radiateurs ou appareils de chauffage.
- Ce haut-parleur contient des circuits haute tension présentant un danger. Ne jamais essayer de le démonter. Il n'y a aucun composant qui puisse être réparé par l'utilisateur. Toutes les réparations doivent être effectuées par du personnel qualifié et agréé par le constructeur.

Deutsch

- Um die Gefahr eines elektrischen Schlages auf ein Minimum zu reduzieren, den Lautsprecher vom Stromnetz trennen, bevor ggf. ein Audio-Schnittstellensignalkabel angeschlossen wird. Das Netzkabel erst nach Herstellung aller Signalverbindungen wieder einstecken.
- Der Lautsprecher an eine geerdete zweipolige Dreiphasen-Netzsteckdose anschließen. Die Steckdose muß mit einem geeigneten Abzweigschutz (Sicherung oder Leistungsschalter) verbunden sein. Der Anschluß der unterbrechungsfreien Stromversorgung an einen anderen Steckdosentyp kann zu Stromschlägen führen und gegen die örtlichen Vorschriften verstoßen.
- Der Lautsprecher nicht an einem Ort aufstellen, an dem sie mit Wasser oder übermäßig hoher Luftfeuchtigkeit in Berührung kommen könnte.
- Darauf achten, daß weder Wasser noch Fremdkörper in das Innere den Lautsprecher eindringen. Keine Objekte, die Flüssigkeit enthalten, auf oder neben die unterbrechungsfreie Stromversorgung stellen.
- Um ein Überhitzen dem Lautsprecher zu verhindern, das Gerät vor direkter Sonneneinstrahlung fernhalten und nicht in der Nähe von wärmeabstrahlenden Haushaltsgeräten (z.B. Heizgerät oder Herd) aufstellen.
- Im Inneren diesem Lautsprecher herrschen potentiell gefährliche Spannungen. Nicht versuchen, das Gerät zu öffnen. Es enthält keine vom Benutzer reparierbaren Teile. Reparaturen dürfen nur von ausgebildetem Kundenienstpersonal durchgeführt werden.

Español

- Para reducir el riesgo de descarga eléctrica, desconecte de la red el altoparlante antes de instalar el cable de señalización de interfaz de la segnale. Vuelva a conectar el conductor flexible de alimentación solamente una vez efectuadas todas las interconexiones de señalizatción.
- Conecte el altoparlante a un tomacorriente bipolar y trifilar con neutro de puesta a tierra. El tomacorriente debe estar conectado a la protección de derivación apropiada (ya sea un fusible o un disyuntor). La conexión a cualquier otro tipo de tomacorriente puede constituir peligro de descarga eléctrica y violar los códigos eléctricos locales.
- No instale el altoparlante en lugares donde haya agua o humedad excesiva.
- No deje que en el altoparlante entre agua ni ningún objeto extraño. No ponga objetos con líquidos encima de la unidad ni cerca de ella.
- Para reducir el riesgo de sobrecalentamiento, no exponga la unidad a los rayos directos del sol ni la instale cerca de artefactos que emiten calor, como estufas o cocinas.
- Este altoparlante contiene niveles de voltaje peligrosos en potencia. No intente desarmar la unidad, pues no contiene piezas que puedan ser repardas por el usuario. Las reparaciones deben efectuarse únicamente por parte del personal de mantenimiento capacitado en la fábrica.

Specifications

Acoustical[1]	
Frequency Response[2]	±4 dB 50 – 160 Hz
Phase Response[2]	±60° 60 – 200 Hz
Maximum SPL	
Music as source	140 peak
Pink noise as source	136 dB continuous; 140 peak ¿¿check
Dynamic Range[3]	> 120 dB
Coverage	120° H x 120° V
Transducers	
Low Frequency	Two 15" diameter MS-15 cone
Audio Input	
Type	10 kΩ impedance, electronically balanced
Connector	XLR (A-3) male and female
Nominal Input Level	+4 dBu (1.23 Vrms)
Amplifiers	
Type	Complementary power MOSFET output stages class AB/H
Burst Capability[4]	1240 Watts (620 Watts per channel)
THD, IM, TIM	< .02 %
AC Power	
Connector	250 V NEMA L6-20P / IEC 309 Twistlock male receptacle
Automatic voltage selection[5]	85 – 134 V / 165 – 264 V; 50 Hz / 60 Hz
Max Continuous RMS Current (> 10s)	115 V: 8 A 230 V: 4 A 100 V: 10 A
Max Burst RMS Current (< 1s)	115 V: 15 A 230 V: 8 A 100 V: 18 A
Max Peak Current During Burst	115 V: 22 Apk 230 V: 11 Apk 100 V: 25 Apk
Soft-Current Turn-on	Inrush current < 12A @115V
Physical	
Dimensions	21.25" W x 56.75" H x 30" D
Weight	221 lb (100 kg); shipping: 267 lb (121 kg)
Enclosure/Finish	Multi-ply hardwood/black textured
Protective Grill	Perforated steel grill, grey foam
Rigging	Six aircraft pan fittings (three on top and bottom). Working load for each fitting is 600 lb, based on a 5:1 safety factor, with a straight tensile pull.

Notes

1. *Acoustical specifications are for the minimum configuration of two DS-2P cabinets and are measured at 2 m on-axis from the 1/R image (located at the rear of the cabinet).*
2. *Subject to half-space loading; measured with one-third octave frequency resolution in fixed ISO bands.*
3. *Measured as the ratio between the peak SPL and the A-weighted noise floor.*
4. *Nominal 8 Ω resistive load, pink noise, 100 V peak.*
5. *The unit is rated at 88–125 V and 182–235 V, 50/60 Hz, to satisfy EC standards for –10% to 6% AC line voltage.*